

A New and Two Rare Species of the Genus *Callionymus* (Callionymidae) from the Western Indian Ocean

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Abstract Three species of dragonets, *Callionymus regani*, sp. nov., *C. gardineri* and *C. spiniceps*, are described from specimens taken from the Saya de Malha Bank in the western Indian Ocean. The latter two are reported as second records with some additional information.

Three species of dragonets were taken during a survey of demersal fish made on the Saya de Malha Bank in the western Indian Ocean (10~12°S, 60~62°E) by the Japan Marine Fishery Resources Research Center at depths between 120 m and 191 m from Aug. 30 to Sept. 5, 1977.

One of these three is described here as a new species of *Callionymus*. The other two were identified as *Callionymus gardineri* Regan and *C. spiniceps* Regan, respectively. Both of them were described by Regan (1908) on the basis of single male specimens. The former was taken from Cargados Carajos at a depth of 20~30 fathoms and the latter from Amirante, the Seychelles, at over 30 fathoms. Both species have not been reported since Regan (1908) described them. In this paper, they are described on the basis of both male and female specimens.

Proportional measurements of these three species are shown in Table 1.

Callionymus regani, sp. nov. (Fig. 1A~F)

Callionymus kaianus (not of Günther); Regan, 1908: 248.

Holotype: HUMZ (Laboratory of Marine Zoology, Faculty of Fisheries, Hokkaido University) 72408, a male, 143.4 mm in standard length, the Saya de Malha Bank, 11°16'S, 61°02'E, at 148 m, Sept. 5, 1977.

Paratypes: HUMZ 72325, a female, 131.5 mm, 11°04'S, 62°10'E, at 187 m, Aug. 31, 1977. HUMZ 72359, a male, 146.3 mm, 11°10'S, 62°08'E, at 191 m, Aug. 31, 1977. HUMZ 72405 and 72407, 2 males, 127.5~

146.7 mm, 11°16'S, 61°02'E, at 148 m, Sept. 5, 1977. HUMZ 73395, a female, 114.5 mm, 11°28'S, 61°31'E, at 176 m, Aug. 30, 1977. HUMZ 73448-73449, 2 males, 142.6~143.8 mm, 11°20'S, 60°43'E, at 147 m, Sept. 2, 1977. HUMZ 73681, a male, 157.5 mm, 10°59'S, 61°02'E, at 126 m, Sept. 5, 1977.

Diagnosis. This species is easily distinguished from the other species of *Callionymus* by the following points: 1) both dorsal and ventral surfaces of the body sepia-brown, 2) 4 large dark brown marks on each side of the body, 3) tip of a median caudal ray unbranched (rarely, 2 rays unbranched), 4) spines of 1st dorsal fin not produced into filaments in either sex, 5) hindmost process of preopercular spine barbed.

Description. D. IV, 9; A. 9; P₁ 19~21 (mostly ii+17~19, rarely i+19, iii+18); P₂ I, 5; C. i+3+i+3+ii (rarely i+3+ii+2+ii, 3+i+3+ii).

Body elongate and depressed. Head depressed. Eye large. Interorbital space narrow and concave. Gill-opening oval, placed in the middle between dorsoposterior edge of eye and upper origin of pectoral fin. Preopercular spine short, with one antrorse process at the base and three on the inner side, the hindmost one barbed. Upper jaw protractile, its posterior end extending to anterior edge of eye. A nostril with a very short tube on each side of preorbital region. Teeth on both upper and lower jaws villiform in broad bands. Palatine and vomer toothless. Anal papilla conical, longer in male than in female. Lateral line single, reaching to tip of median caudal ray; the line of opposite side

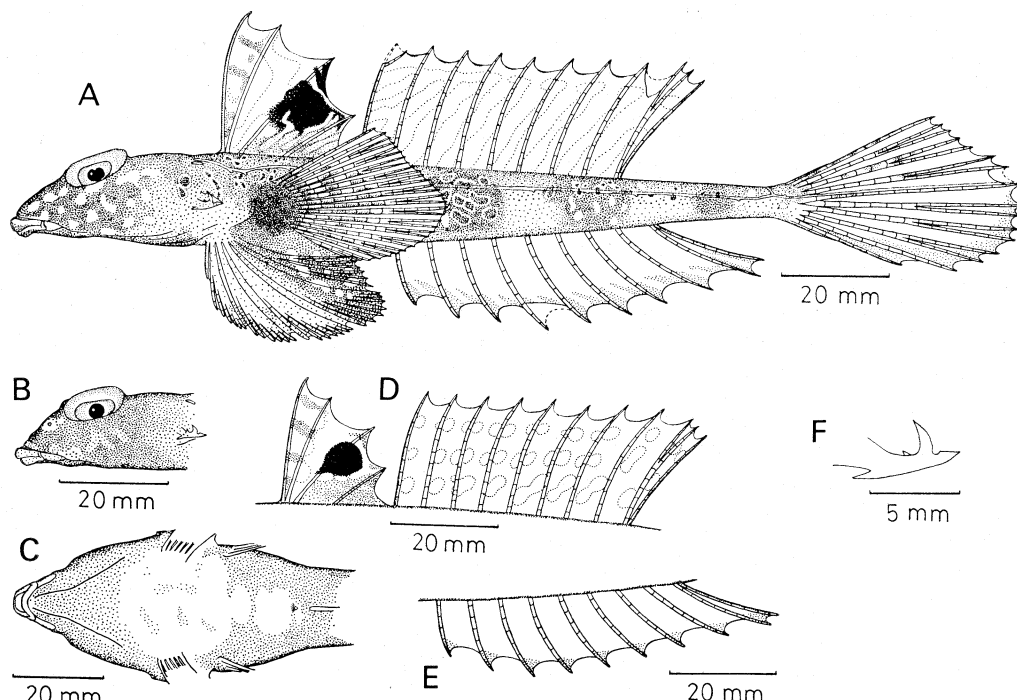


Fig. 1. A: Lateral view of the holotype of *C. regani*, HUMZ 72408, male. B: Lateral view of head of HUMZ 72325, female. C: Ventral view of HUMZ 72325, female. D: 1st and 2nd dorsal fins of HUMZ 72325, female. E: Anal fin of HUMZ 72325, female. F: Preopercular spine of HUMZ 72408, male.

interconnected by a transverse branch across occiput and dorsal surface of caudal peduncle. Skin of body thin.

First dorsal fin beginning behind gill-opening. Dorsal spines not produced into filaments in either sex. Dorsal rays almost all of the same length and unbranched except the last, tip of anterior branch of last dorsal ray bifurcate. Anal rays increasing in length posteriorly and unbranched except the last; tip of each ray simple. Upper half of pectoral fin slightly emarginated, lower half rounded. Pelvic fin rounded and short, reaching nearly to origin of anal fin, and connected by membrane to the middle part of pectoral fin base. Caudal fin rounded and short. Caudal fin rays not produced into filaments in either sex, and tip of a median caudal ray unbranched, but in one specimen two median caudal rays unbranched.

Color in life: Both upper and lower surfaces of body sepia-brown. In some specimens abdominal region white. Floor of mouth

transparent. Four large dark brown marks on each side of body, 1 on pectoral fin base and the other 3 on lateral side behind origin of anal fin; darker in male than in female. Many yellow spots on cheek, dorsal and lateral sides of body in male but only a few in female. A large black mark with white margin between 3rd and 4th dorsal spines, square in male and round in female. Anterior part of 1st dorsal fin with three or four yellow oblique lines. Second dorsal fin with several yellow oblique lines in male and three rows of yellow spots in female. Posterior part of pelvic fin dark brown with some yellow spots, darker in male than in female. Lower margin of anal fin faint brown with a white oblique line on each membrane in male, and only yellow in female. Three vertical rows of yellow spots on upper part of caudal fin and faint brown on lower margin.

Color in isopropyl alcohol: Yellow spots fade. Especially the 2nd dorsal fin becomes

Table 1. Proportional measurements, in hundredths of standard length, of the 3 dragonets. Data show ranges and in parentheses means and sample size.

Sex	<i>C. regani</i>				<i>C. gardineri</i>				<i>C. spiniceps</i>			
	Holotype		Paratypes		male		female		male		female	
	male	1	male	6	male	1	female	2	male	2	female	7
No. fish	143.4	1	127.5~157.5	114.3~131.5	137.9	114.1	1	90.8~92.9	21.5~21.7(21.6,2)	18.9~24.3(22.1,7)	86.4~100.2	
Standard length (mm)	19.2		19.0~21.0(19.8,6)	21.0~21.9(21.5,2)	24.3	25.0		21.5~21.7(21.6,2)	12.1~13.2(12.7,2)	12.1~14.9(13.5,7)	5.2~5.5(5.4,7)	
Body width	11.8		10.6~12.0(11.7,6)	11.0~12.1(11.6,2)	11.3	10.2		5.4~5.6(5.5,2)	27.9~28.7(28.3,2)	56.3~68.1(61.4,7)	27.6~30.3(28.4,7)	
Body depth	4.0		3.0~4.0(3.6,6)	3.8~4.0(3.9,2)	5.4	5.1		30.9	30.9	30.9	30.9	
Caudal peduncle depth	27.8		27.5~29.0(28.2,6)	29.5~30.0(29.8,2)	30.9	30.9		54.7	45.7	27.3	27.3	
Predorsal length	31.2		28.0~31.0(30.1,4)	31.0~32.2(31.6,2)	27.3	27.3		8.2	8.4	9.1~10.0(9.6,2)	8.9~11.1(10.2,7)	
Caudal fin length	25.4		24.3~26.6(25.7,6)	25.9~26.2(26.1,2)	11.1	11.0		9.5	9.5	6.7~7.0(6.9,2)	6.6~7.8(6.9,7)	
Head length	8.6		8.2~9.5(8.9,6)	8.7~10.4(9.6,2)	8.2	8.4		1.0	1.8	1.0~1.1(1.1,2)	0.7~1.1(0.9,7)	
Eye diameter	9.6		8.4~10.0(9.4,6)	8.6~10.0(9.3,2)	11.1	11.0		35.8	17.7	56.8~63.0(59.9,2)	36.3~54.2(41.6,6)	
Snout length	7.7		7.4~8.5(8.0,6)	8.0~8.1(8.1,2)	9.5	9.5		15.6	16.7	15.7~16.5(16.1,2)	15.4~18.3(17.0,7)	
Upper jaw length	1.3		1.1~2.0(1.6,6)	1.5~1.7(1.6,2)	1.0	1.8		15.2	15.8	18.0~18.1(18.1,2)	16.8~19.0(17.6,6)	
Interorbital width	18.8		14.8~18.6(16.9,6)	16.6~18.2(17.4,2)	35.8	17.7		9.1	9.2	11.9~12.2(12.1,2)	10.2~11.1(10.8,6)	
1st dorsal spine length	18.0		14.5~17.3(16.4,6)	16.0~16.4(16.2,2)	15.6	16.7		16.1	16.1	20.6~20.7(20.7,2)	19.8~23.1(21.5,6)	
2nd dorsal spine length	17.2		13.8~16.6(15.3,6)	15.2~15.4(15.3,2)	15.2	15.8		21.4	21.3	20.5~21.5(21.0,2)	17.8~20.0(19.0,6)	
3rd dorsal spine length	10.5		8.0~10.2(9.5,6)	8.7~8.8(8.8,2)	9.1	9.2		10.4	10.4	10.4~10.4(10.4,2)	9.2~11.0(9.8,7)	
4th dorsal spine length	—		14.1~16.6(15.2,6)	15.7~16.8(16.3,2)	16.1	16.1		20.6~20.7(20.7,2)	20.6~20.9(20.8,2)	17.7~19.9(18.5,7)		
1st dorsal ray length	17.6		13.6~16.3(15.3,5)	16.9~17.3(17.1,2)	21.4	21.3		8.6	10.0	20.6~20.9(20.8,2)	17.7~19.9(18.5,7)	
Last dorsal ray length	8.4		7.0~7.9(7.5,6)	7.0~8.4(7.7,2)	8.6	10.0		19.6	19.9	21.5~23.1(22.3,2)	19.1~23.9(22.3,7)	
1st anal ray length	15.6		13.4~15.1(14.1,6)	15.0~16.2(15.6,2)	20.7	19.9		31.3	31.1	31.3~31.7(31.5,2)	29.9~32.6(31.4,7)	
Pectoral fin length	19.5		17.1~18.5(18.0,6)	17.4~17.5(17.5,2)	20.7	19.9		8.0	8.9	14.0~15.5(14.8,2)	15.9~17.1(16.3,4)	
Pelvic fin length	25.3		22.2~23.8(22.8,6)	23.1~24.5(23.8,2)	31.3	31.1		1.7	1.2	1.7~1.8(1.8,2)	0.4~1.0(0.8,5)	
Preopercular spine length	4.4		4.7~5.5(5.1,6)	4.8 (4.8,1)	8.0	8.9						
Anal papilla length	1.5		1.8~2.3(2.0,6)	0.7~1.0(0.9,2)	1.7	1.2						

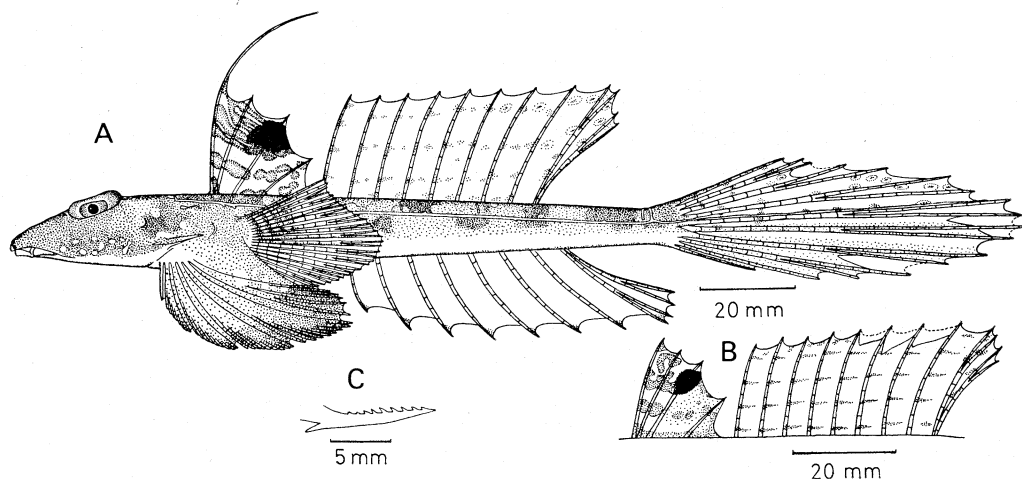


Fig. 2. A: Lateral view of *C. gardineri*, HUMZ 72406, male. B: 1st and 2nd dorsal fins of HUMZ 73450, female. C: Preopercular spine of HUMZ 72406, male.

almost transparent.

Remarks. *Callionymus regani* is closely related to *C. carebares* of Alcock (1890), *C. kaianus* of Günther (1880) and *C. sokonumeri* of Kamohara (1936) in having a barbed process on the preopercular spine and one or two unbranched median caudal rays. This species is more allied to *C. carebares* than to *C. kaianus* and *C. sokonumeri* in body coloration; the former two are sepia-brown but the other two are olive-brown. *C. regani* differs from *C. carebares* in having a transparent mouth floor (dusky in *C. carebares*), and also differs from *C. carebares*, *C. kaianus* and *C. sokonumeri* in having four large marks on the lateral side of the body in both sexes and brown surface on the ventral side of the body in both sexes.

Regan (1908) reported a female of *C. kaianus* from the Saya de Malha Bank, but I think he misidentified *C. regani* as *C. kaianus* because his specimen does not have a long filamentous 1st dorsal spine (*C. kaianus* has a long spine in both sexes). Therefore, *C. regani* was named for C. T. Regan.

Callionymus gardineri Regan
(Fig. 2A~C)

Callionymus gardineri Regan, 1908: 248, pl. 30, fig. 5 (type locality: Cargados Carajos in the western Indian Ocean).

Materials: HUMZ 72406, a male, 137.9 mm, 11°16'S, 61°02'E, at 148 m, Sept. 5, 1977.

HUMZ 73450, a female, 114.1 mm, 11°20'S, 60°43'E, at 147 m, Sept. 2, 1977.

Description. D. IV, 9; A. 8; P₁ ii+18~19; P₂ I, 5; C. i+7+ii.

Body elongate and depressed. Head depressed. Snout longer than eye. Interorbital space narrow and concave. Gill-opening oval, placed in the middle between dorso-posterior edge of eye and upper origin of pectoral fin. Preopercular spine straight, one antrorse process at the base and 8~9 short processes on inner side. Upper jaw protractile, and posterior end of maxillary not extending to anterior edge of eye. A nostril with very short tube on each side of preorbital region. Teeth on upper and lower jaws villiform in broad bands. Palatine and vomer toothless. Occipital region rugose. Anal papilla conical, elongate in male and short in female. Lateral line single, reaches to tip of a median caudal fin ray; the line of opposite side interconnected by a transverse branch across occiput and the dorsal surface of caudal peduncle; 5 separated short branches of lateral line, perpendicularly to the main line, on each side of dorsal area of the body.

First dorsal fin beginning behind gill-opening. First dorsal spine produced into a filament in male but not in female. Both dorsal and anal rays increasing in length posteriorly and unbranched except the last, both tips of which are bifurcate. Upper half of pectoral fin slightly emarginated, lower half rounded; its

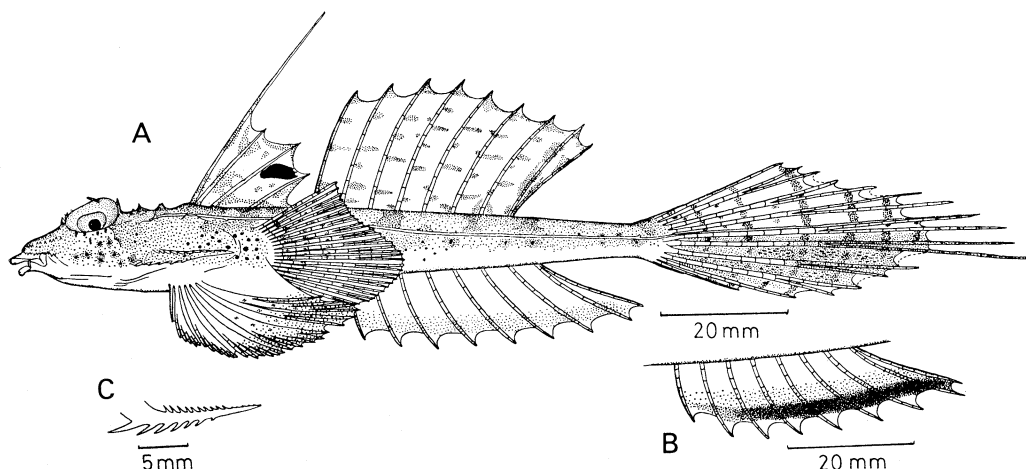


Fig. 3. A: Lateral view of *C. spiniceps*, HUMZ 74144, female. B: Anal fin of HUMZ 74147, male. C: Preopercular spine of HUMZ 74146, female.

tip extending to vertical through 2nd anal ray. Pelvic fin rounded, extending to 1st anal ray, and connected by membrane to the middle part of pectoral base. Caudal fin rounded and elongate, slightly longer than one half of standard length in male and slightly shorter in female.

Color in isopropyl alcohol: Upper half of body marbled brown and lower half white. A faint dusky area on throat in male. First dorsal fin with several undulating oblique dark stripes and large black blotch on distal part of the area around 3rd dorsal spine. Second dorsal fin with three or four rows of dusky spots in male, dusky short stripes in female. Upper half of pectoral fin with some dusky spots. Posterior half of pelvic fin dusky. Distal margin of anal fin dusky. Lower half of caudal fin faintly dusky.

Color in life (male only): Some yellow spots on cheek and posterior part of pelvic fin. Undulating oblique stripes on 1st dorsal fin orange-colored. Many rows of faint orange-colored spots on 2nd dorsal and upper half of caudal fin.

Remarks. The male specimen described here slightly differs from Regan's original description of this species in its black mark on the 1st dorsal fin. The former has a large black blotch around the 3rd dorsal spine, but the latter has only a small black spot on the distal end of it. This is possibly

due to individual variation correlated with maturity.

Smith (1963) regarded this species and *C. maldivensis* Regan as synonymous with *C. japonicus* Houttuyn, but these three are probably separate species. *C. maldivensis* has an oblong blackish blotch on the throat in male, but males of *C. gardineri* have a faint dusky area there. The first and second dorsal spines produce into filaments in males of *C. japonicus* but only the 1st one in males of both *C. gardineri* and *C. maldivensis*.

Callionymus spiniceps Regan (Fig. 3A~C)

Callionymus spiniceps Regan, 1908: 249, pl. 30, fig. 4 (type locality: Amirante, Seychelles).

Materials: HUMZ 73203, a female, 86.4 mm, 10°43'S, 60°55'E, at 125 m, Sept. 4, 1977. HUMZ 74142~74144, 74146~74150, 2 males and 6 females, 87.5~100.2 mm, 10°54'S, 61°15'E, at 120 m, Sept. 6, 1977.

Description. D. IV, 8 (rarely 9); A. 8; P₁ ii+18~20; P₂ I, 5; C. i+7+ii.

Body elongate and depressed. Head depressed. Eye large. Interorbital space narrow and concave. A thread-like short cirrus on dorsoposterior edge of eye. Gill-opening oval, placed at origin of 1st dorsal fin. Preopercular spine straight and elongate, about one half of head length, with 6~9 processes on outer side and 10~15 ones on inner side. Upper jaw protractile, and posterior end of

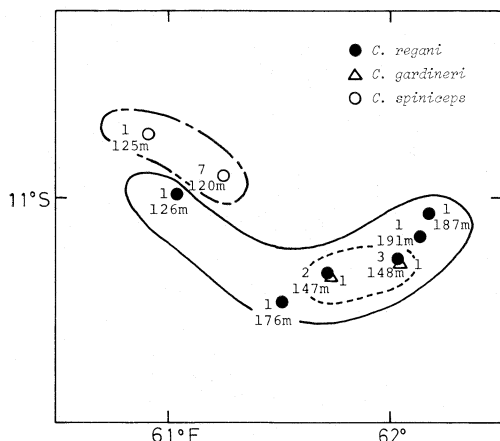


Fig. 4. Sampling area of the three dragonets. Numerals in the top line show the number of fish and bottom line depth of the sampling station in meters.

maxillary not reaching to anterior edge of eye. A nostril with a very short tube on each side of preorbital region. Teeth on both upper and lower jaws villiform in broad bands. Palatine and vomer toothless. Pre-orbital area, lateral ridge of ethmoid, supra-orbital ridge and occipital region with many short bony processes. Predorsal short, about as long as head. Anal papilla conical, long in male and short in female. Lateral line single, reaching to distal end of median caudal ray; the line of opposite side interconnected by a transverse branch across occiput, but not across dorsal surface of caudal peduncle. Skin of body thin.

First dorsal spine produced into a filament in both sexes, longer in male than in female. Both dorsal and anal rays unbranched except the last; tip of each ray simple. Median dorsal rays slightly longer than the others. Anal rays increase in length posteriorly. Upper half of pectoral fin slightly emarginated, lower half rounded; its tip extending to vertical through 3rd anal ray. Pelvic fin rounded, extending to 1st anal ray and connected by membrane to the middle part of pectoral base. Caudal fin elongate, longer in male than in female; median rays produced into filaments in both sexes.

Color in isopropyl alcohol: Body faint marbled brown above, white below. Many small dark spots on cheek, shoulder and the

middle of body. A large black blotch on membrane between 3rd and 4th dorsal spines. Some oblong dusky spots on each membrane of 2nd dorsal fin. Upper half of pectoral fin rays with some dusky spots. Distal part of pelvic fin dusky. Anal fin with a dark marginal band, blackish in male and dusky in female. Caudal fin with several dark cross-bars and lower half dusky.

Color in life (male only): Many orange-colored spots on 1st and 2nd dorsal fins and caudal fin. These spots change to dusky ones in isopropyl alcohol.

Remarks. *Callionymus spiniceps* is closely related to *C. muscatensis* described by Regan (1905) and *C. draconis* described by Nakabo (1977) in having the same type of preopercular spine and a short predorsal length. This species is easily distinguished from the other two by having many small bony processes on the preorbital area, a lateral ridge of ethmoid, a supraorbital ridge and an occipital region.

This species has a supraorbital cirrus which Regan did not note.

Notes on the locality of the three dragonets (Fig. 4)

Callionymus spiniceps and *C. regani* were not collected at the same station. The former seems to inhabit a shallower area than the latter. *C. gardineri* was collected within the range of *C. regani*.

Acknowledgments

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- (Department of Fisheries, Faculty of Agriculture, Kyoto University, Oiwake-cho, Sakyo-ku, Kyoto 606, Japan)
- 西部インド洋から得たネズッポ属魚類の1新種と2稀種
- 中坊徹次
- 西部インド洋, Saya de Malha Bank より1新種を含む3種のネズッポ属魚類が採集された。新種 *Callionymus regani* は尾鰭中央部軟条の1本(稀に2本)の先端が分枝していないこと, 体側に4個の大きな褐色の斑点を持つこと, そして体の側面から腹面にかけて雌雄共にセビア色である点で近縁種と明瞭に区別される。他の2種, *C. gardineri* と *C. spiniceps* は第2番目の記録として, 新たに見い出された形質を付け加えて記載した。
- Callionymus spiniceps* と *C. regani* は混獲されず, 前者はより浅い所, 後者はより深い所から採集された。*C. gardineri* は *C. regani* と混獲された。
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